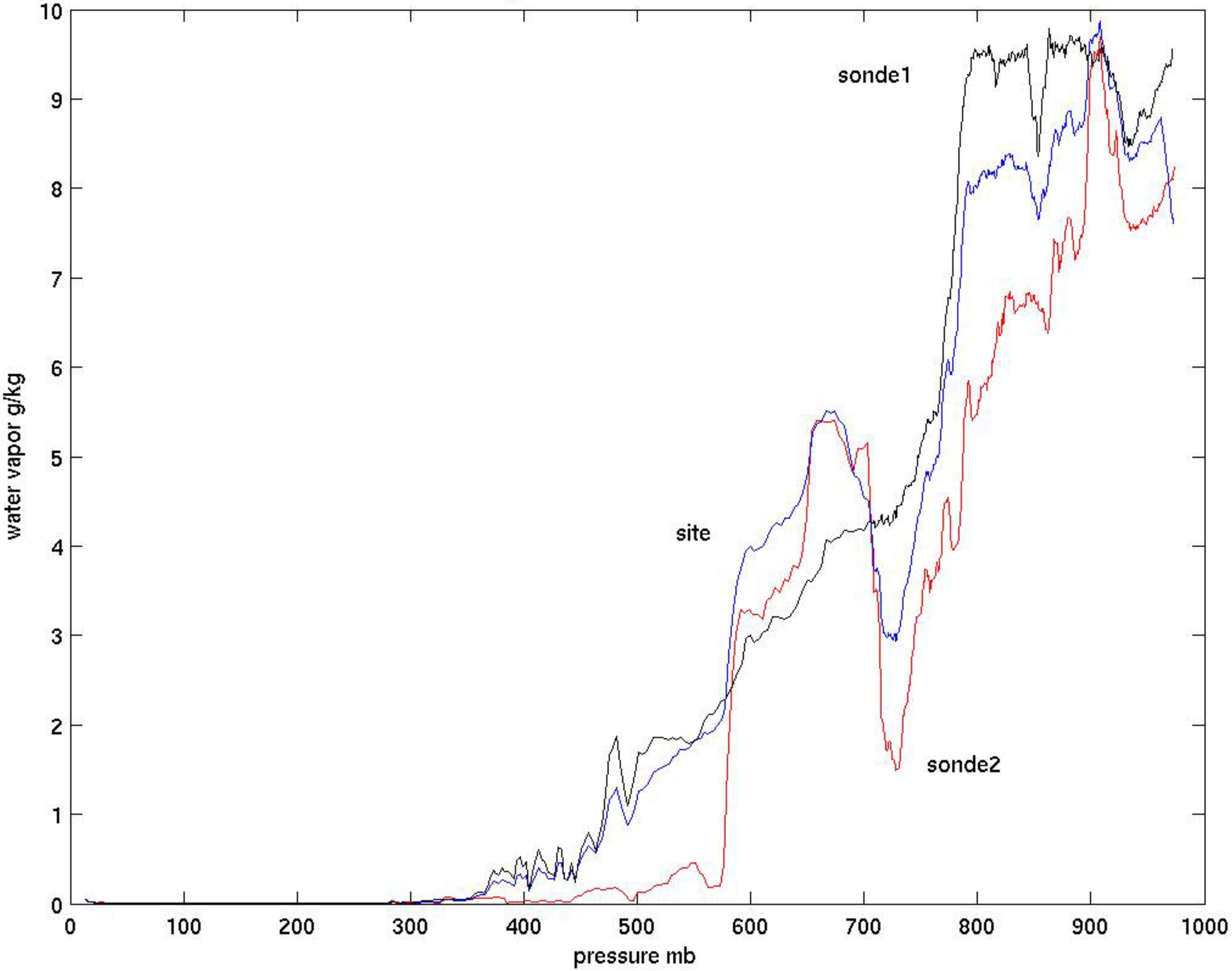
P. Rosenkranz AIRS Team Meeting Camp Springs, MD Feb. 25-27, 2003

Updated Comparison of AMSU/HSB Observations with Brightness Temperatures Calculated from Radiosondes

- The ARM-SGP radiosondes have been added to the previous base of co-located PREPQC (synoptic) radiosonde matchups from July 4 and July 20, 2002, for obs-calc comparisons.
- In the first two graphs, the two raobs launched for an overpass of the ARM site on the morning of Sept. 27 are compared with the "site profile" which is intended to be the best estimate for the overpass time. The water-vapor profiles differ considerably between the two raobs (only about 40 min. apart). The site profile is not always intermediate between the raob profiles.

armbe sgp v1.00 2002-09-27-083439.cdf



armbe sgp v1.00 2002-09-27-083439.cdf

temperature

300
290
280
270
260
250
240
230
220
210
200

site
sonde1
sonde2

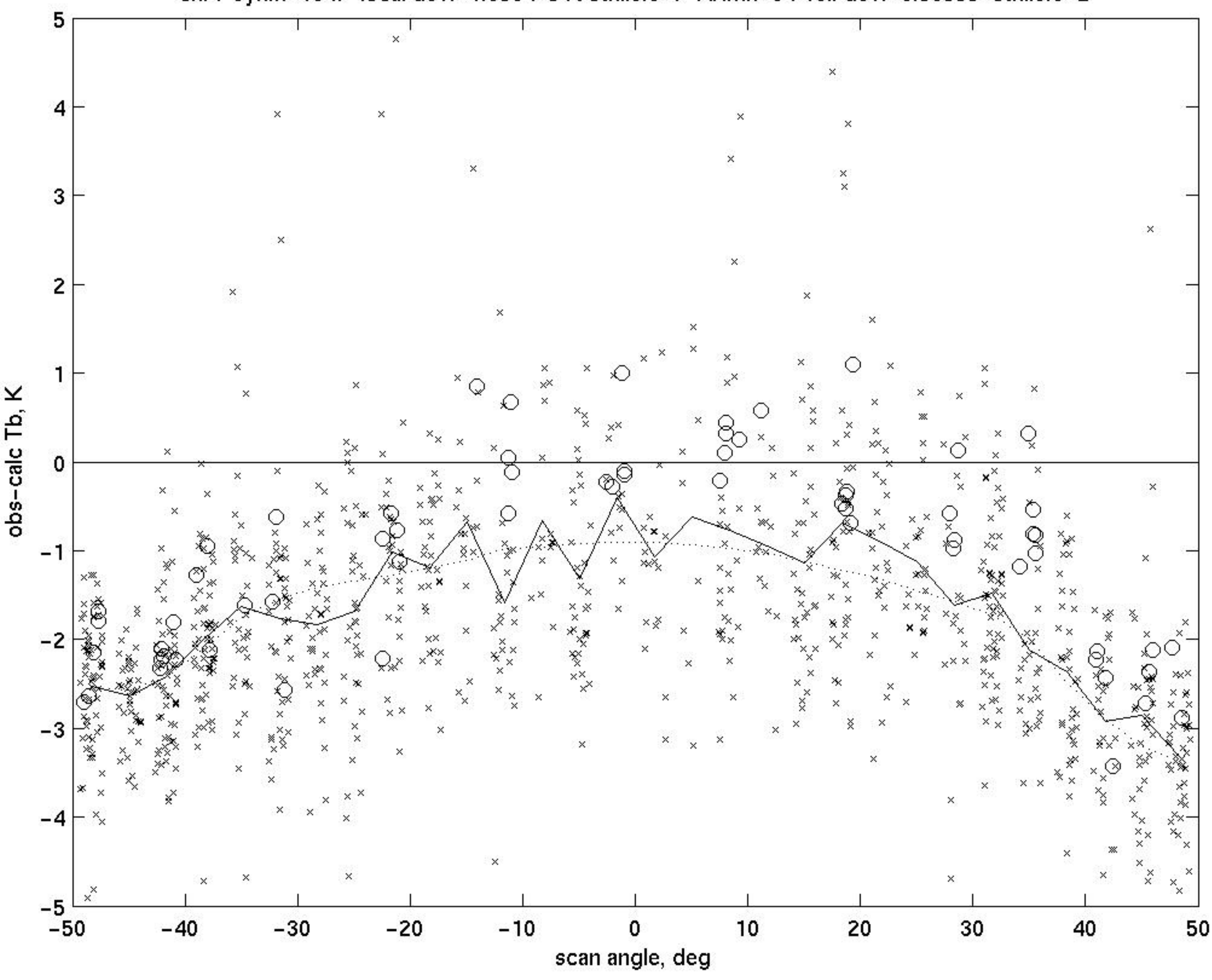
10^1
10^2
10^3

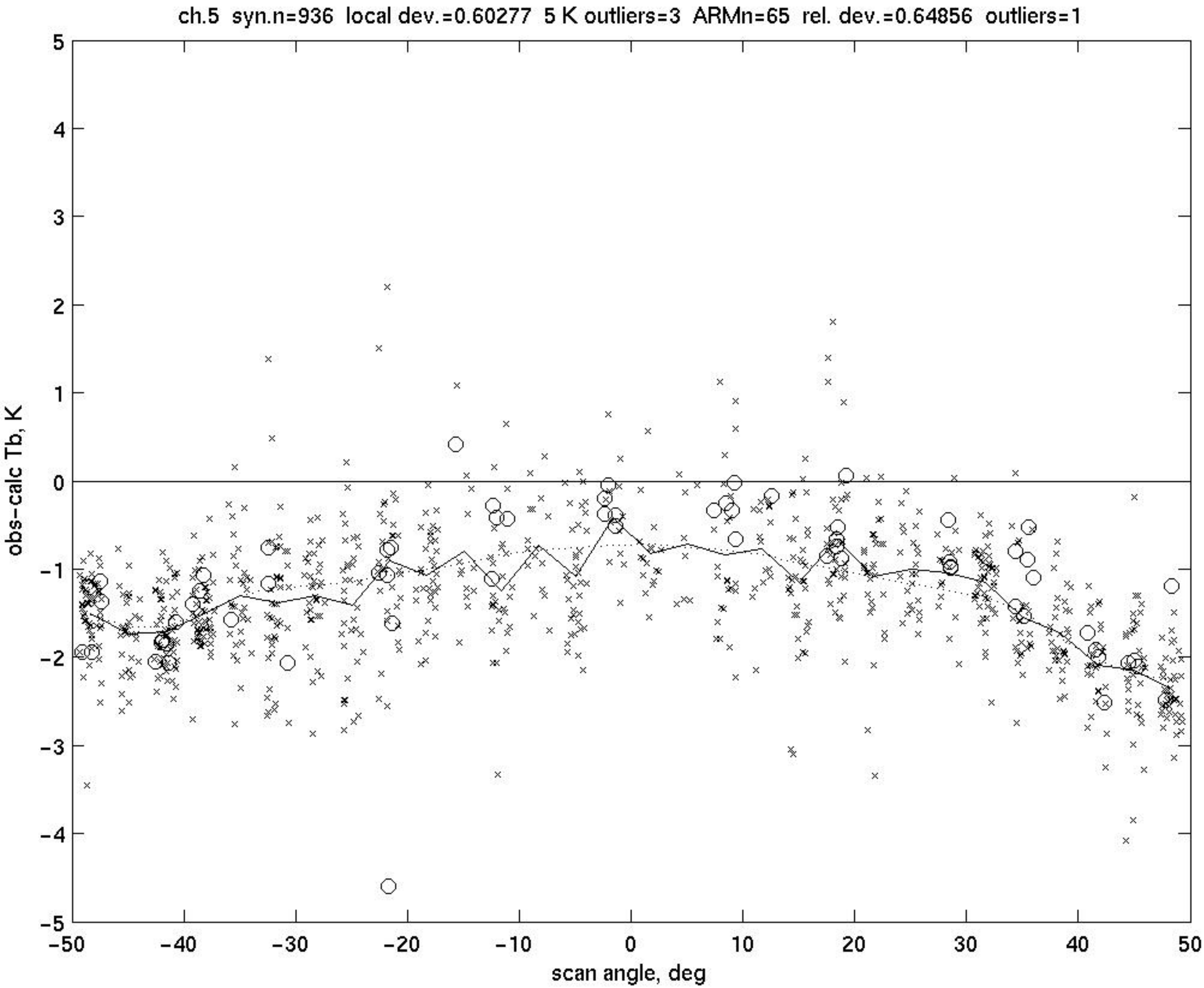
pressure

- For computation of brightness temperatures on the AMSU temperature channels 4-9 (next 6 plots), either sonde 1 or sonde 2 was used, whichever reached the higher altitude. Few raobs reached altitudes high enough to compute reliable Tb's for channels 11-14.

- Synoptic raobs are plotted with x's, and ARM raobs with o's. The solid line in each plot is the local mean, at each scan angle, of the obs-calc from the synoptic raobs, and the dotted line is GSFC's (revised) bias determined from ECMWF analyses. In the captions, "local deviation" is the standard deviation of the synoptic obs-calc about the local mean, and "rel.deviation" is the standard deviation of the ARM obs-calc about the synoptic local mean. Differences larger than the vertical plot range are not used in the statistics, but the number of these outliers is noted.

- For the synoptic raobs, profiles with retrieved liquid water integral > 0.1 mm, were excluded; for ARM raobs, the ground-based radiometric liquid water measurement was tested instead.


ch.4 syn.n=1047 local dev.=1.0904 5 K outliers=7 ARMn=64 rel. dev.=0.93959 outliers=2
obs−calc Tb, K
scan angle, deg
5
4
3
2
1
0
−1
−2
−3
−4
−5
−50
−40
−30
−20
−10
0
10
20
30
40
50


ch.5 syn.n=936 local dev.=0.60277 5 K outliers=3 ARMn=65 rel. dev.=0.64856 outliers=1
obs−calc Tb, K
scan angle, deg
5
4
3
2
1
0
−1
−2
−3
−4
−5
−50
−40
−30
−20
−10
0
10
20
30
40
50

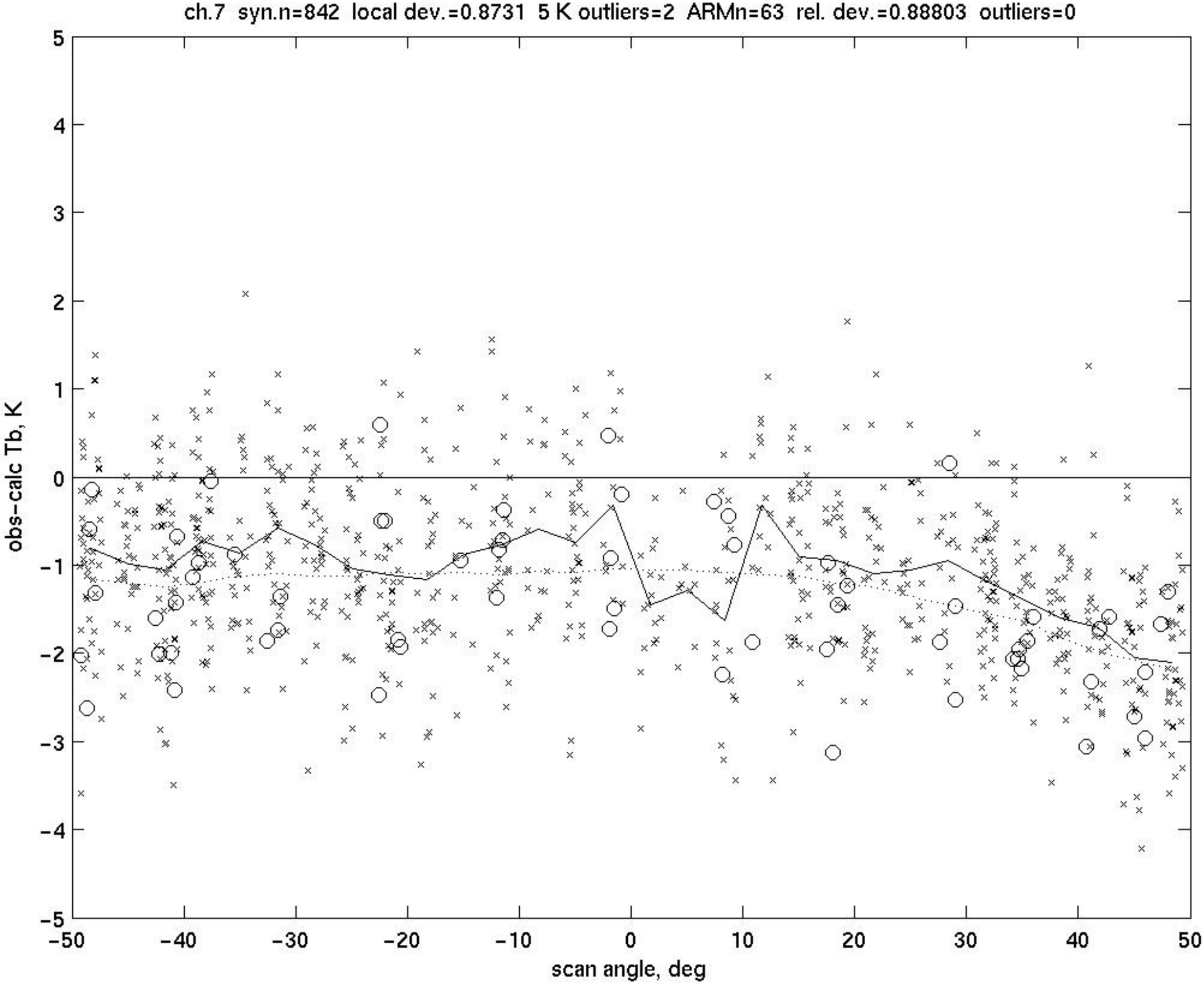
ch.6 syn.n=902 local dev.=0.4751 5 K outliers=3 ARMn=64 rel. dev.=0.44454 outliers=0

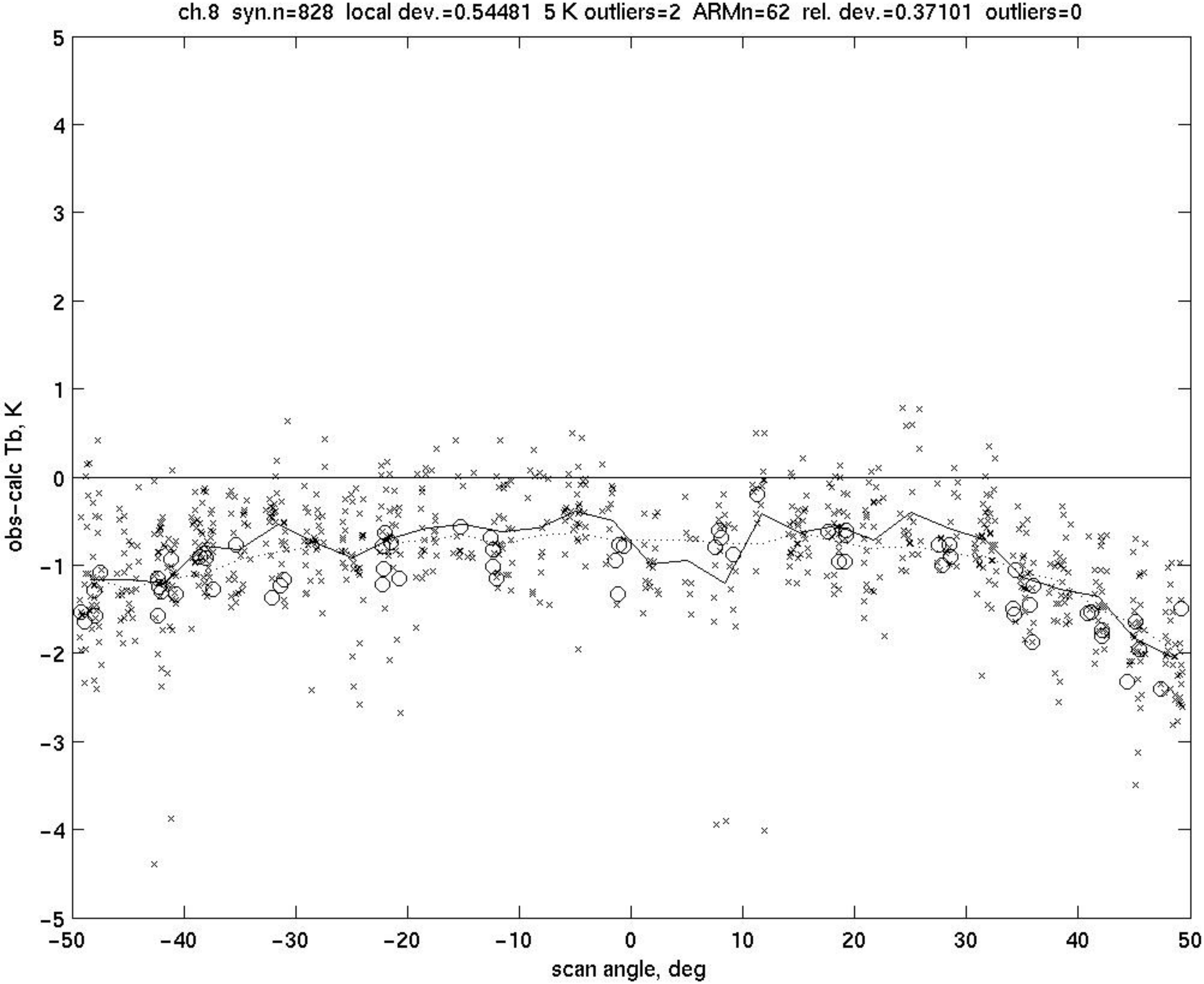
obs−calc Tb, K

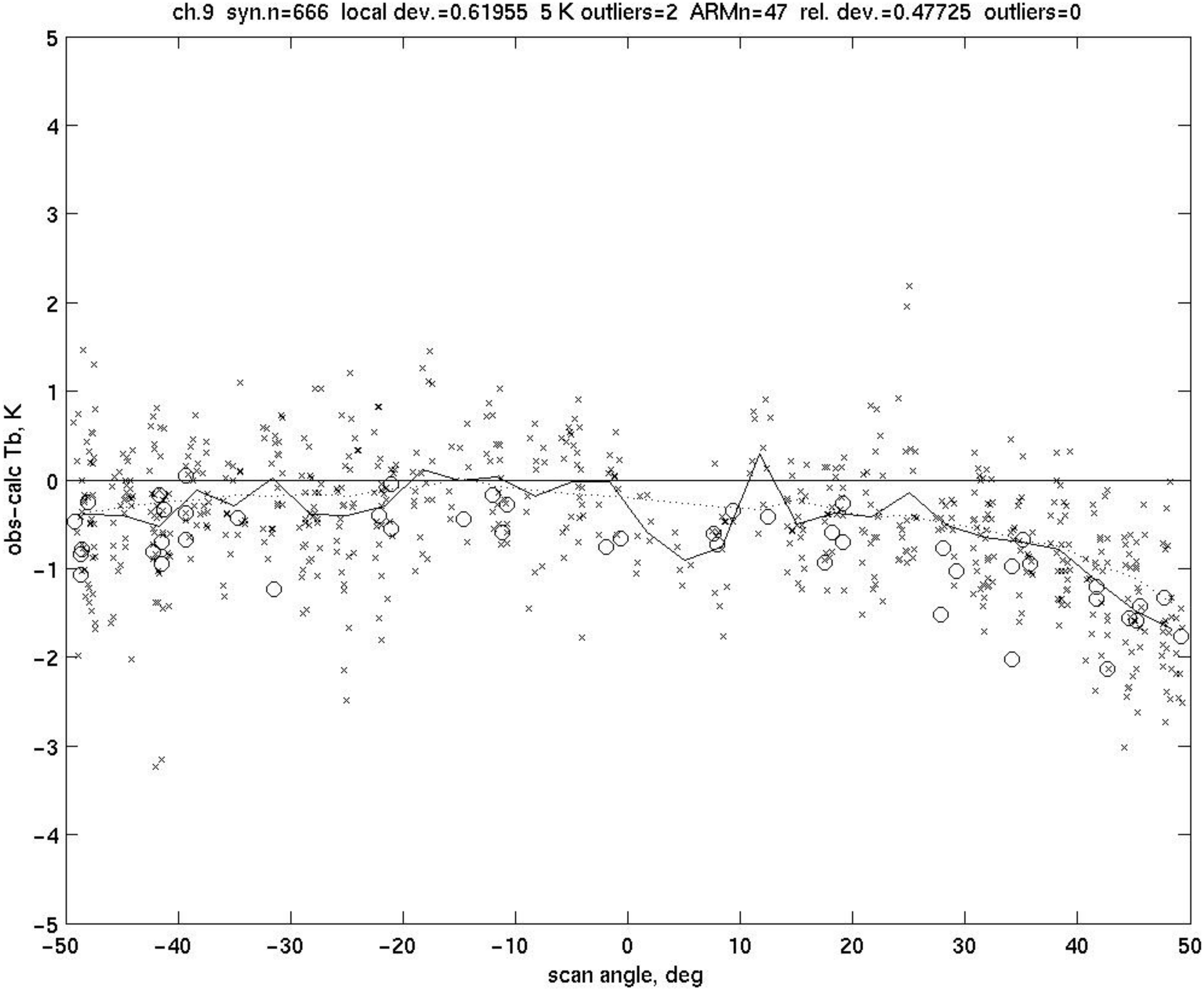
5
4
3
2
1
0
−1
−2
−3
−4
−5

−50 −40 −30 −20 −10 0 10 20 30 40 50

scan angle, deg

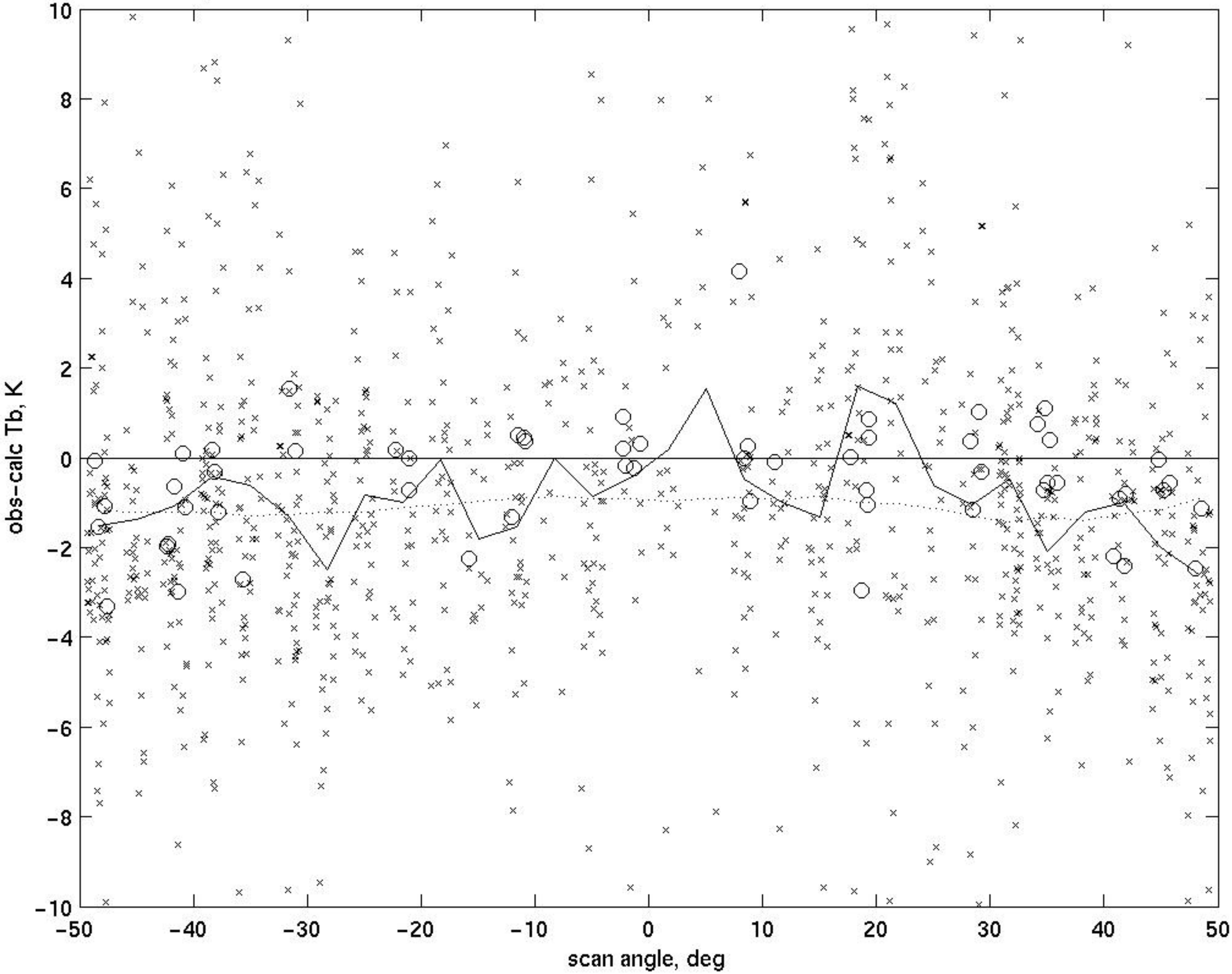

ch.7 syn.n=842 local dev.=0.8731 5 K outliers=2 ARMn=63 rel. dev.=0.88803 outliers=0
obs-calc Tb, K
scan angle, deg
5
4
3
2
1
0
−1
−2
−3
−4
−5
−50
−40
−30
−20
−10
0
10
20
30
40
50


ch.8 syn.n=828 local dev.=0.54481 5 K outliers=2 ARMn=62 rel. dev.=0.37101 outliers=0
obs−calc Tb, K
scan angle, deg
5
4
3
2
1
0
−1
−2
−3
−4
−5
−50
−40
−30
−20
−10
0
10
20
30
40
50

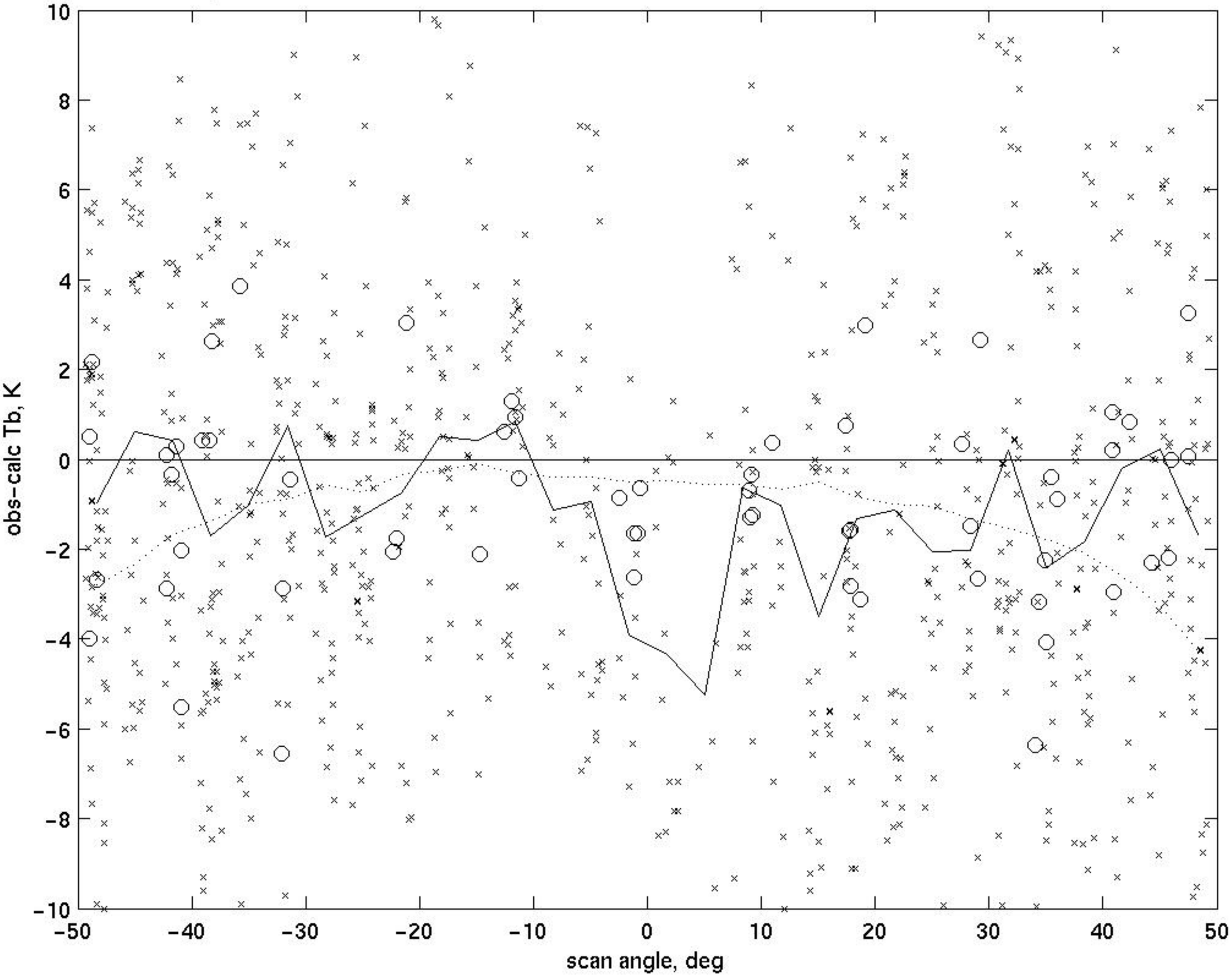

ch.9 syn.n=666 local dev.=0.61955 5 K outliers=2 ARMn=47 rel. dev.=0.47725 outliers=0
obs−calc Tb, K
scan angle, deg
5
4
3
2
1
0
−1
−2
−3
−4
−5
−50
−40
−30
−20
−10
0
10
20
30
40
50

- The site profile was used to compute Tb's for the HSB channels 17-20 (last 4 plots). Within the matchup golfball, the HSB footprint closest to the raob was selected for the comparison, and only one matchup was used per raob. For these channels, which sense water vapor, the scatter of the ARM raobs is appreciably less than for the synoptic raobs. Here the standard deviation for ARM is calculated about its own mean (bias) instead of the synoptic local deviation, which is erratic. However, the number of ARM raobs is not great enough to calculate a mean at each angle.

ch.17 syn.n=945 local dev.=3.3366 outliers=47 ARMn=59 bias=-0.50402 std. dev.=1.2595 outliers=1



ch.18 syn.n=759 local dev.=4.3714 outliers=51 ARMn=60 bias=-0.89567 std. dev.=2.205 outliers=0



ch.19 syn.n=941 local dev.=3.076 outliers=15 ARMn=59 bias=-0.46935 std. dev.=1.2434 outliers=1

obs-calc Tb, K

scan angle, deg

ch.20 syn.n=978 local dev.=2.3261 outliers=5 ARMn=59 bias=-0.27374 std. dev.=0.99035 outliers=1